Remarks/Arguments

Reconsideration of this application is requested.

Claim Status

Clams 1-20 are pending. Since no claims are added, canceled or amended, no listing of claims is required under 37 CFR 1.121.

Claim Rejections – Ishii

Claims 1-4 and 12-14 are rejected under 35 USC 102(e) as anticipated by Ishii (US 6,847,469). In response, applicant traverses the rejections and submits that the claims as filed distinguish over all references of record.

The present invention is directed to an image processing device which appropriately and automatically determines whether or not to eliminate isolated points for image data to be processed. As disclosed in the flowchart of FIG. 5, after receiving image data in step S200, a plurality of isolated points are detected for each page of image data (step S201 and S202). For each page of data, if the number of isolated points is below a threshold value, the isolated points are eliminated by an image processing circuit 16 and the page is printed out. However, if the number of isolated points are at or above the threshold value, the page is printed out with the isolated points (paragraphs 0025-0027). Thus, the isolated points on a page of image data are first detected and then counted before being compared to a threshold value to determine whether or not to eliminate the isolated points.

Importantly, the isolated points are counted after the detection of the isolated points for an entire page. As shown in FIG. 2, an isolated point detecting circuit 14 detects black pixel isolated points, which are output as "1" from AND gate 14F to counter 14G (paragraphs 0019-0021). The counter value is then compared to a threshold value stored in register 14H. Accordingly, the present invention eliminates isolated points based on the number of total isolated points, unlike conventional solutions which eliminate isolated points based solely on detection. This distinction is crucial and is included in each of the independent claims 1, 5, 7, 11 and 13. Claim 1, for example, recites:

an isolated point detecting unit that detects isolated points from image data;

a counting unit that counts the isolated points detected by the isolated point detecting unit; and

an isolated point eliminating unit which eliminates the isolated points from the image data when a number of the counted isolated points reaches a threshold value or less

The cited references clearly do not operate in this manner. Ishii is directed to an image processing apparatus that determines and removes an isolated point in conjunction with the single instruction multiple data stream (SIMD) control method. Ishii uses a conventional run length method to detect an isolated point using a black and white pixel counter value that is compared to a threshold pixel value to determine if the pixel is an isolated point (col. 1, lines 23-32 and col. 5, lines 33-42). However, Ishii teaches that, "such a counter is not applicable to the SIMD control method," (col. 5, lines 41-45 and col. 2, lines 30-31). Accordingly, Ishii teaches against combining the counter of its run length method with the SIMD method.

In Ishii, run length counters are used only to determine whether a pixel is an isolated point. The number of isolated points can only be counted after detection, and since Ishii does not provide a counter after isolated point detection, it cannot disclose or suggest a counting unit that counts isolated points detected by an isolated point detection unit, as is required by applicant's independent claims.

Moreover, Ishii does not remedy the deficiencies of conventional solutions. Ishii discloses a SIMD method to determine whether a pixel P is an isolated point by referring to a plurality of nearby pixels 401, 402L and 402R. Ishii's FIG. 5 compares the intensity of pixels 401 to a first threshold value TH1, and compares the intensity of a second pixel section 402L and 402R to a second threshold value TH2. Using the results of those comparisons, "the pixel P being processed is

determined to correspond to an isolated point, and the pixel data of the pixel P being processed is subjected to an isolated point removing process," (col. 6, lines 39-42). Therefore, once the center pixel is determined to be an isolated point, isolated removing unit 104 removes the isolated point without any further processing (col. 3, lines 18-20, FIG. 5 and col. 6, lines 38-44).

As in the run length method, a counter for the detected isolated points is not disclosed. Threshold values TH1 and TH2 are used for determining whether a pixel is an isolated point and not for determining whether to eliminate the detected isolated points. Therefore, Ishii does not compare the number of detected isolated points to a threshold value before eliminating the isolated point. Thus, the run length method and Ishii's SIMD method do not disclose or suggest a counter that counts the number of isolated points.

The present invention, by contrast, requires a counter to count the number of isolated points after the isolated points have been detected, and comparison of that number to a threshold value. Ishii's counter and threshold values are used merely in conjunction with detection of an isolated point.

Since Ishii does not disclose each and every element of independent claims 1 11 and 13, it cannot anticipate those claims or claims 2-4 and 12, 14, 16 and 18-20 dependent thereon. The rejections under 35 USC 102 should therefore be withdrawn.

Claim Rejections – Lee

Claims 5-11 and 15-20 are rejected under 35 USC 102(b) as anticipated by Lee (US 6,160,913). In response, applicant traverses the rejections and again submits that the claims distinguish over all references of record. As with Ishii, Lee does not disclose or suggest counting the number of isolated points that are detected and comparing this number of isolated points with a threshold value.

Lee is directed to an image processing method for detection and removal of halftone dots by first converting a gray scale image into a binary threshold image with halftone dots (Abstract). To remove the halftone dots, the "thresholded" image

is used to produce a halftone classification map (FIG. 5), halftone reclassification map (FIG. 8) and halftone line map (FIG. 9). As shown in FIG. 11, the halftone line map and thresholded image are used to determine the isolated points (block 1112) which are immediately removed (block 1114) to produce a thresholded image without halftone dots. As shown in FIGS. 5 and 8, a counter is provided to count the pixels adjacent to a center pixel in a local map to determine if the center pixel should be labeled as halftone or non-halftone for the halftone reclassification and line maps. The total number of halftone pixels are not counted. A threshold value for eliminating isolated points is not disclosed.

In Lee's FIG. 11, a counter is provided to count the number of black pixels adjacent to a center pixel (col. 8, lines 58-67) to determine whether or not to change a black center pixel into a white pixel. Again, the total number of halftone pixels are not counted. In fact, when an isolated point is detected at block 1112-Yes, the isolated point is eliminated. Consequently, pixel color is not changed based on a comparison of the counter number to a threshold value of counted isolated points. Thus, counters and threshold values are provided merely to label a pixel or to change a pixel color. In sum, Lee does not disclose counting the number of detected isolated points and comparing that number to a threshold value, as required by the independent claims.

Moreover, page 4 of the Action asserts that Lee anticipates a register to which a threshold value is written, as recited in independent claim 5. Applicant disagrees. In Lee (col. 9, lines 1-6 and 34-35), pixel data is outputted as a threshold image 22 and a pixel matrix is written in registers and line buffers. However, threshold image 22 containing pixel data is clearly not a threshold value since threshold image 22 is processed image data, while a threshold value is a single number useful in comparison. Thus, a threshold value stored in a register is not disclosed.

With respect to dependent claim 6, applicant submits that image resolution is not disclosed. Lee discloses that every pixel of image data undergoes the halftone

removal process. Although every image inherently has an associated resolution, Lee does not disclose or suggest that the threshold values Tn1 and Tn2 are set according to an image resolution. In fact, there is no disclosure of the criteria for setting threshold values Tn1 and Tn2.

Since Lee does not disclose each and every element of independent claims 5, 7 and 11, it cannot anticipate those claims or claims 6, 8-10, 12, 15 and 17 dependent thereon. The rejections under 35 USC 102 should therefore be withdrawn.

Conclusion

This application is in condition for allowance. The Examiner is invited to telephone the undersigned to resolve any issues that remain after entry of this amendment. Any fees due with this response may be charged to our Deposit Account No. 50-1314.

Respectfully submitted,
HOGAN & HARTSON L.L.P.

Date: June 12, 2007

By: _____
Troy M. Schmelzer
Registration No. 36,667
Attorney for Applicant(s)

1999 Avenue of the Stars, Suite 1400
Los Angeles, California 90067
Phone: 310-785-4600
Fax: 310-785-4601